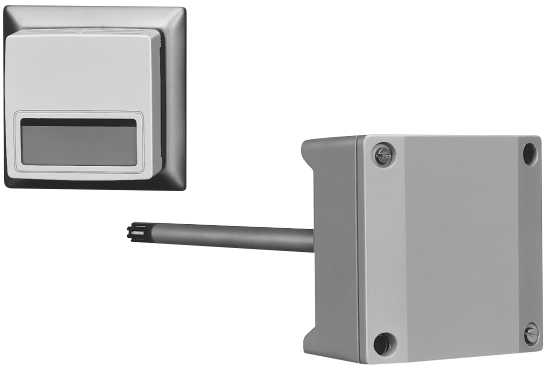
RHS301R0/302R0
RH Sensor
Relative humidity and temperature detector
User's Manual



Thank you for purchasing the RH Sensor.
This manual contains information for ensuring correct use of the RH Sensor. It also provides necessary information for installation, maintenance, and troubleshooting.
This manual should be read by those who design and maintain devices that use the RH Sensor.
Be sure to keep this manual nearby for handy reference.

RESTRICTIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment.
Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

NOTICE

Be sure that the user receives this manual before the product is used.

Copying or duplicating this user's manual in part or in whole is forbidden. The information and specifications in user's manual are subject to change without notice.

Considerable effort has been made to ensure that user's manual is free from inaccuracies and omissions. If you should find an error or omission, please contact Yamatake Corporation.

In no event is Yamatake Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

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SAFETY PRECAUTIONS

Safety precautions are intended to ensure the safe and correct use of this product, to prevent injury to the operator and others, and to prevent damage to property. Be sure to observe these safety precautions, and be sure to read and understand the contents of this manual.

⚠ CAUTION

Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to the product.

⚠ CAUTION	
❗	Wire the RH sensor according to the instructions herein, using the specified type of wire and wiring methods. Failure to do so could cause fire or device failure.
❗	Use this device within the specified operating conditions for temperature, humidity, voltage, vibration, shock, atmosphere, etc. Failure to do so could cause fire or device failure.
❗	For the RHS302R0, be sure to use the included cable gland or, if rainproof installation is needed, obtain a waterproof cable gland and seal well. Failure to do so could cause fire or device failure.

UNPACKING

Check the following items when removing the RH sensor from its package:
If there is some problem with your order, please contact your dealer immediately.

RHS301R0

- Main body
- Accessories
  - Base plate
  - Mounting bracket
  - 1 set of mounting screws
  - Instructions (this document)

RHS302R0

- Main body
- Accessories
  - Membrane filter (81403424-001), 1 set
  - Cable gland
  - 1 set of mounting screws
  - Sticker for determining hole positions
  - Instructions (this document)

1. Overview

The RHS301R0 and RHS302R0 are highly accurate and reliable relative humidity detectors that use the latest polymer humidity sensor for superior sensitivity, response and reproducibility. Additionally, since RH sensor have a built-in temperature sensor, they can measure temperature and relative humidity at the same time, and transmit the readings as a 1-5 Vdc or 4-20 mAdc output signal.

Model number	Type	Options	Specifications
RHS			RH sensor
	301R0		Indoor wall-mount
	302R0		Duct mount
		00	Standard
		D0	With inspection data
		Y1	ISO compliant
		Y2	Traceability validation

2. Mounting

■ Location

Mount the detector in a location meeting the following criteria:

- Operating ambient temperature:
  -5 to +55 °C
  -20 to +80 °C for the sensor part of the RHS302R0
- Operating ambient humidity:
  10 to 90 % RH (without condensation) for the case
  0 to 100 % RH (without condensation) for the sensor
- Vibration and shock:
  None
- Sunlight and heat:
  Avoid direct sunlight, radiant heat, etc.
- Atmosphere:
  No flammable, corrosive, or explosive gases. No conditions that would be harmful to humans.

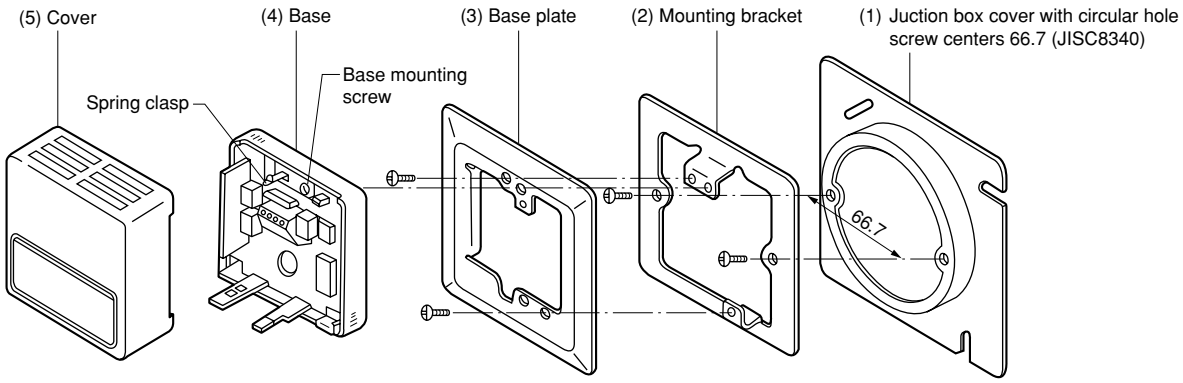
Wind speed:
Humidity can be measured at wind speeds up to 5 m/s. If the wind speed is higher, attach the sintered metallic filter (81403426-001, 133 µm) to the RHS302R0 duct-mount detector. This will allow measurement up to 20 m/s.

- Dust:
  No dust or tobacco smoke
- Electrical noise:
  Keep as far away as possible from high-power electromagnetic switches, equipment emitting strong high-frequency radio waves, SCR units, etc.

■ Mounting method

● RHS301R0

1. Procure a junction box cover with a circular hole (JIS C8340) as shown in (1) of the figure.
2. After mounting the junction box cover (1), attach in order the mounting bracket (2), base plate (3), base (4) and cover (5) using the included screws.

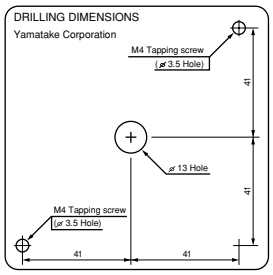


Note: Make sure the RHS301 cover is securely attached to its base and held in place by the spring clasp. When removing the cover, press down on the spring clasp through the ventilation hole at the top of the indicator unit, and gently pull the cover off.

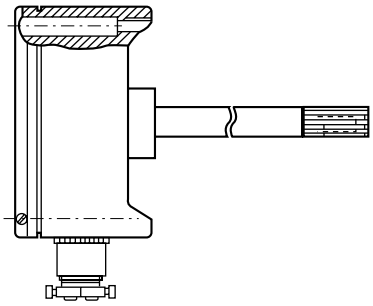
● RHS302R0

1. Affix the drilling dimensions sticker to the mounting surface and drill the specified holes.

Sticker for determining hole position



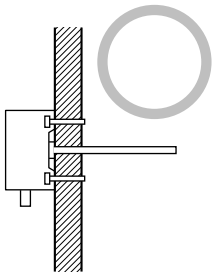
RHS302R0



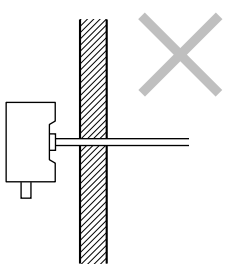
2. Mount by inserting the probe into the hole and tightening the 2 included screws firmly.

Note: Do not mount by only inserting the probe into the hole. Make sure to use the screws.

Correct



Incorrect



3. Wiring

■ Cautions for wiring

● Suitable cable

- Signal wire
  - Use a twisted shielded pair
  - Recommended type:
    Hitachi Cable, Ltd.,
    JKPEV-S-0.9mm^2 or equivalent (2 pairs)
- Power cable
  - 600V vinyl-insulated cable (JIS C3307 or equivalent)
  - Conductor diameter 0.5 to 1.25 mm
  - Outside diameter 2.0 to 3.2 mm

● Terminal block

- Suitable wire size: 0.5 to 1.5 mm^2
- Recommended screwdriver tip size: 2.5 mm wide × 0.35 mm thick

■ Inductive interference and noise suppression

- Do not bundle the output signal wires together with commercial power cables or run them together in the same conduit. Keep the output signal wires at least 50 cm away from commercial power cables.
- If necessary, mount a filter or surge absorber on motors and other noise-emitting equipment. A filter is effective for a fast rising surge, and a varistor is effective for a pulse surge with a high crest.

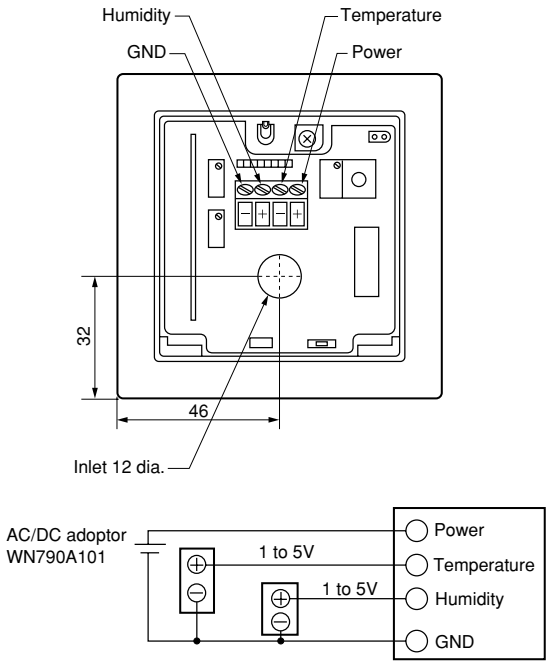
■ Wiring check and confirmation

Before use, make sure there are no mistakes in the wiring.

Terminal connection

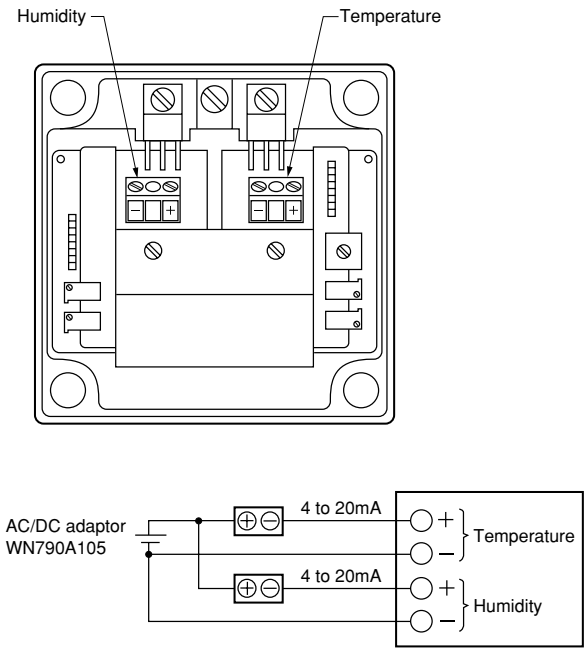
Unit : mm

Indoor wall-mount type: Model No. RHS301R0



Note: ⊕ ⊖ indicates the input of a controller or recorder.

Duct mount type: Model No. RHS302R0



Note: ⊕ ⊖ indicates the input of a controller or recorder.

4. Maintenance and Calibration

Obtain an accurate humidity measuring instrument to use for calibration. Compare the humidity reading of the RH sensor with that of the instrument used for calibration.

If the difference exceeds the accuracy specification of the RHS, return it to Yamatake Corporation for calibration. Generally we recommend calibration once per year, but the frequency of calibration depends upon the operating conditions. At first, try calibrating 2 or 3 times per year, and determine the optimum calibration frequency on the basis of your experience.

Cautions for calibration

The presence of a person near the RH sensor may cause the temperature and humidity to vary. Keep away from the RH sensor when taking measurements. If that is not possible, keep your body as far away as possible, and come near the device with your hand only.

Room temperature and humidity may vary, for example between the south and north sides of the room. Measure at points that are typical for the whole room.

Because the humidity sensor has a fast response, output variations may be caused by the wind. We recommend filtering the output, for example by having the receiving instrument take a moving average.

5. Specifications

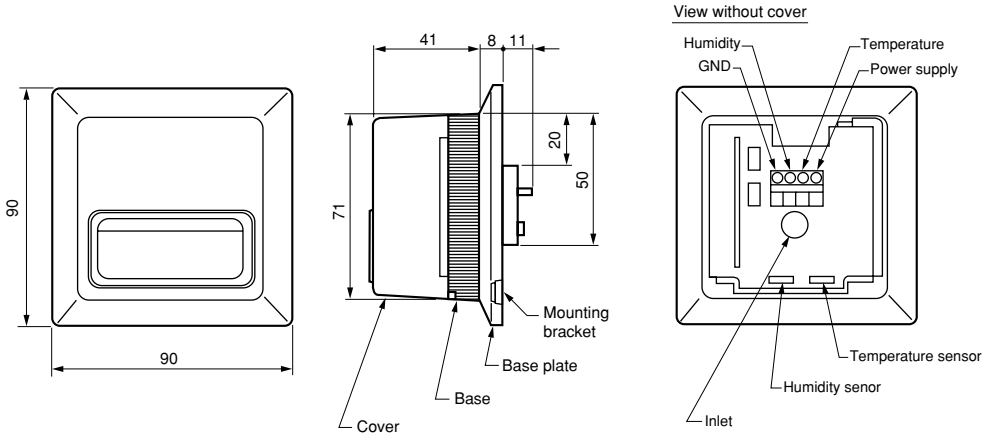
Model number		RHS301R0		RHS302R0	
Type		Indoor wall-mount		Duct mount	
Sensor	**Humidity**	Capacitive thin polymer film			
	Temperature	Platinum resistance temperature detector (JIS Pt100Ω)			
Measuring range	**Humidity**	0 to 100%RH (no condensation allowed)			
	Temperature	0 to 50°C		-20 to +80°C	
Accuracy	**Humidity**	+/-2%RH: 0 to 90%RH, +/-3%RH: 90 to 100%RH (at 20°C)			
	Temperature	+/-0.2°C (at 20°C)			
Hysteresis	**Humidity**	1%RH or less			
	Temperature	0.1°C or less			
Humidity drift per temperature		+/-0.04%RH/°C			
Response time		10s (rise time up to 90%)		20s (rise time up to 90%)	
Output	**Humidity**	1-5Vdc linear	Allowable load resistance:	4-20mAdc	Allowable load resistance:
	Temperature	1-5Vdc linear	10kΩ min.	4-20mAdc	500Ω max.
Operating temperature		-5 to +55°C		-5 to +55°C (case) -20 to +80°C (sensor part)	
Storage temperature		-40 to +55°C			
Rated power voltage		12Vdc		24Vdc	
Operating power voltage		11 to 15Vdc		20 to 30Vdc	
Power consumption		120mW or less		800mW or less	
Insulation resistance		50MΩ min. between each terminals and case with 50Vdc Megger			
Withstand voltage		1500Vac, 1min. between power terminals and case			
Vibration resistance		4.9m/s² or less (10-60Hz)			
Impact resistance		490m/s² or less			
Case material		ABS resin		Aluminum die-cast (Probe: stainless steel)	
Sealing		Indoor type		Dustproof and splash-proof construction: IP55 (case)	
Case color		Pail-beige		Gray	
Mass		120g		590g	
Accessories		Base plate, Mounting bracket, 1 set of mounting screws, Instructions (this document)		Membrane filter (81403424-001): 1 set, Cable gland, 1 set of mounting screws, Sticker for determining hole positions, Instructions (this document)	
Optional parts (sold separately)		AC/DC adaptor: WN790A101		AC/DC adaptor: WN790A105	
				Sintered metallic filter: 81403426-001, 133 μm (for dust-proof and high wind)	

6. External dimensions

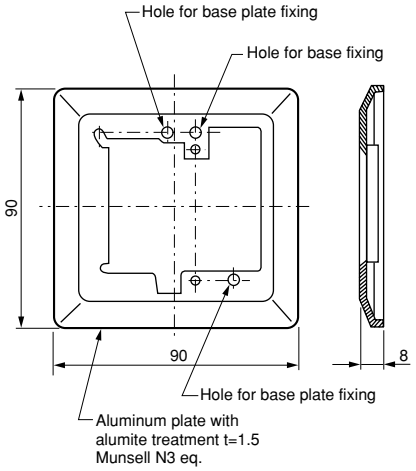
● RHS301R0

Unit : mm

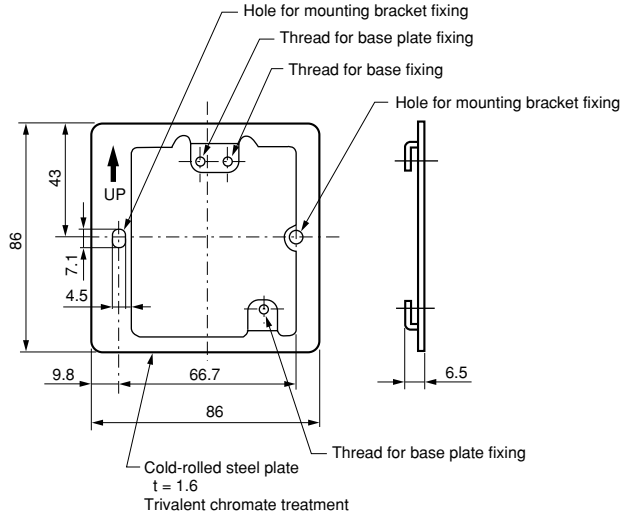
Main body



Base plate (accessory)

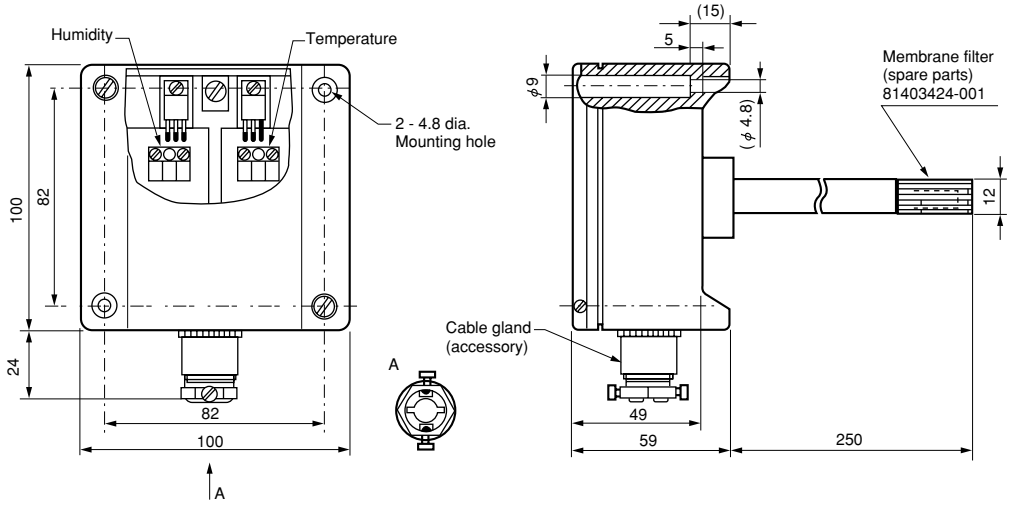


Mounting bracket (accessory)



● RHS302R0

Main body



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